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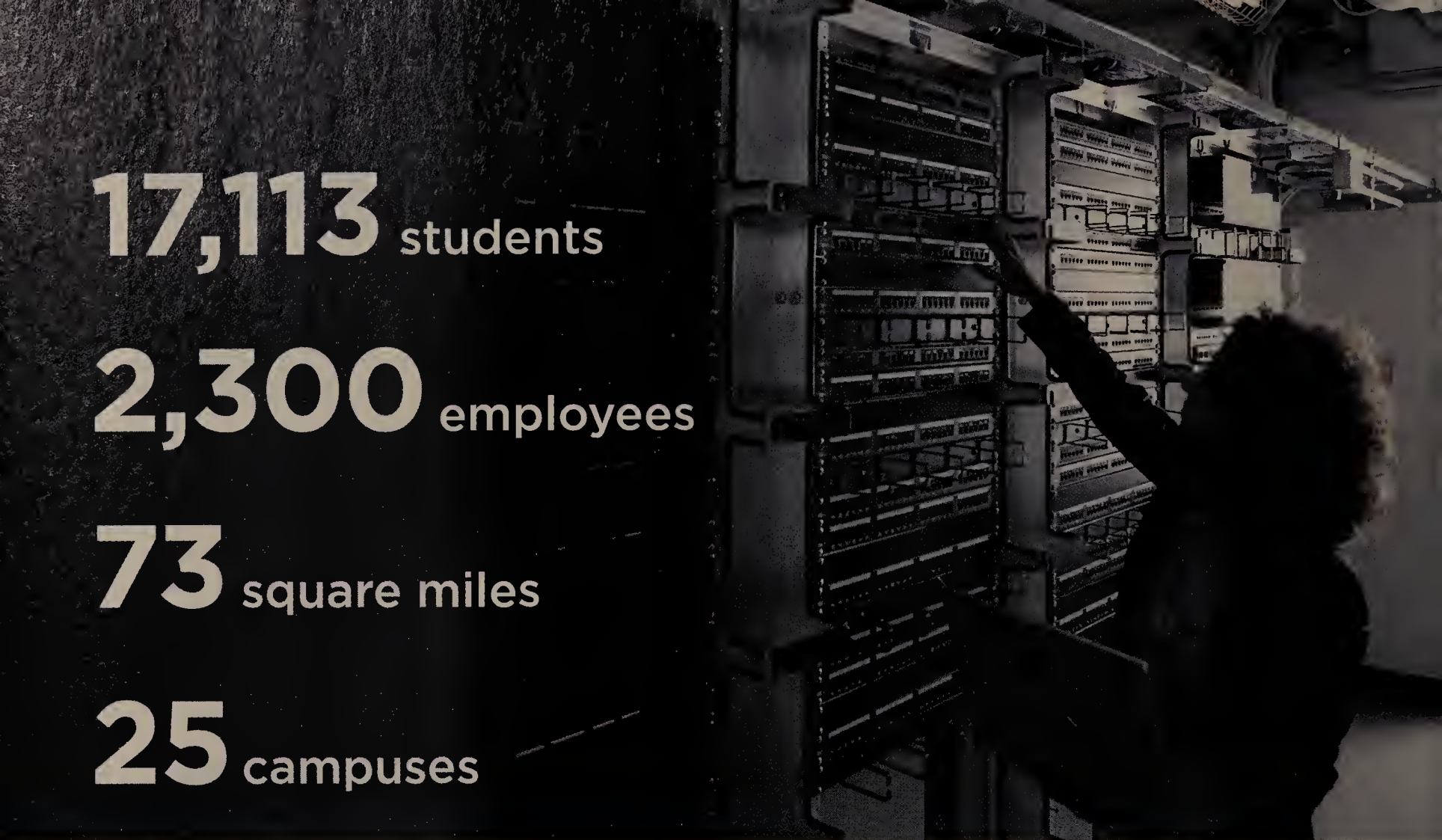
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FROM THE EDITOR | JOHN DIX

# The water pump alarm

**I**f nothing else, the now disputed “hacking” of an Illinois water utility has brought the spotlight back on the vulnerability of our national infrastructure.

This subject goes in and out of vogue in various government circles, yet we still seem to be treading water, waiting for a real attack to make us serious about addressing the threat.

Many thought the early reports out of Springfield on Nov. 10 were the opening salvo. That day, the Illinois Statewide Terrorism & Intelligence Center (STIC) issued a report titled “Public Water District Cyber Intrusion.”

The report said someone in Russia had hacked into a SCADA contractor and purloined credentials that were then used to access controls in Springfield’s Curran-Gardner Public Water District. By repeatedly cycling a pump on and off, it was believed the attacker managed to cause that device to fail. (See story, page 10.)

If true, the incident would be the first reported domestic attack on a utility from a foreign land to result in damage, and potentially portend more significant attacks.

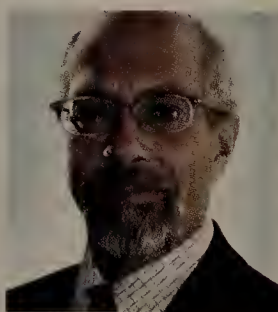
The FBI and Department of Homeland Security’s Industrial Control Systems Cyber Emergency Response Team (ICS-CERT) have since concluded there was no evidence of an attack, but the way the whole incident unfolded is reason enough for concern.

Consider the glacial response. Illinois issued the report on a Thursday. ICS-CERT didn’t become aware of it until the following Wednesday. If the incident was real — and there was no evidence at the time that it was anything but — shouldn’t alarm bells have started to ring upstream somewhere? And while ICS-CERT did jump on some log analysis when it finally became aware of the event, it didn’t actually send a team in to investigate until many days after that.

In the post 9/11 era, is this adequate? One would think not given that, one, the very existence of the ICS-CERT is acknowledgement enough that the threat is to be taken seriously. And two, DHS acknowledges there have already been intrusions. Greg Schaffer, acting deputy undersecretary of the Department of Homeland Security’s National Protection and Programs Directorate, was quoted in the *Washington Post* saying the bad guys “are knocking on the doors of these systems. In some cases, there have been intrusions” (see the story at [tinyurl.com/3nvctar](http://tinyurl.com/3nvctar)).

While this whole incident increasingly appears to have been a false alarm, the real alarm is our lackadaisical response. Addressing the process for reacting to events is a lot easier than addressing the inadequacies of infrastructure security, yet evidently we haven’t even gotten that right yet.

What’s it going to take before the government mandates that national infrastructure security is brought in line with enterprise network security? Unfortunately, I think we all know the answer to that.



*John A. Dix*

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# peersay

## YaCy, a new approach to search

➔ **NOT SURE HOW** well this would work with re-search (as opposed to “research”) (Re: “Free software activists to take on Google with new free search engine”; [tinyurl.com/cpvuxlp](http://tinyurl.com/cpvuxlp)).

One of the features of Google search that I tend to rely on is the consistency of the results themselves and visual cues that show me which results I have clicked on in the past. As a developer I find that I tend to re-search things a lot, using the Internet as a sort of reference manual.

I do love the idea of decentralized search on the Internet, however. I work for an online company that lives (and dies) by our Google rankings. I have stood on my soapbox at many a meeting letting management know that we are doing wrong by relying on Google for so much of our success.

*SpottedMarley*

## Screen size vs. resolution

➔ **NOT ALL THAT** worked up about the new iPhone if and when it arrives; frankly, I think the 3.5-inch screen on the 4 and 4S is great. The key factor is screen (pixel) density, not necessarily size, and going from 3.5 inches to 4 inches while retaining the same resolution will just make the screen bigger and slightly grainier (Re: “Apple prepping iPhone 5 with 4-inch screen along with redesigned MacBook Pro in 2012”; [tinyurl.com/7vj3ys7](http://tinyurl.com/7vj3ys7)).

Now, the quadruple-resolution iPad 3 that’s been rumored? I’ll actually get in line and pre-order that one.

*crOff*

## Lagging IPv6 adoption

➔ **WE IN ASIA** are mystified by the resistance of U.S. network professionals to IPv6. IPv4 was a great technology, but it has outlived its usefulness (Re: “Hackers target IPv6”; [tinyurl.com/cl7zeqe](http://tinyurl.com/cl7zeqe)).

Waiting for ARIN to run out is like waiting for the last horse to die before buying your first car. The rest of the world is now learning to drive these cool new car thingies and building roads and filling stations for them (IPv6 infrastructure).

We are training next-generation mechanics (IPv6-savvy engineers and developers). You may feel nostalgic for your old nag, but we in Asia will easily win all the races. The ARIN region is dead last in the world in terms of percent of networks with IPv6 (about 5% in 2011).

Soon enough, you will realize that resistance is futile.

*Lawrence Hughes*

## IT’s age problem

➔ **NOTHING CHANGES WHEN** you pass 45. If you aren’t prepared to learn new things, be cooperative and flexible, work well with others, etc., then you’re going to have a tough time at 25, 45 or 65 (Re: “IT’s age problem”; [tinyurl.com/6wlq5uo](http://tinyurl.com/6wlq5uo)).

Personally, I’ve found aging to be a bonus — my personal network is large, and I’ve had time to build my reputation. I’ve learned how to overcome the personal issues that I had when younger. And my skillset is growing — having around 30 years of experience (including a computer science degree) means I understand how these computer things are meant to work at a fundamental level. The even better news is that computing hasn’t really changed that much — in fact, with the rise of Linux, it’s getting closer

and closer to the SVR4 world that I started my working life in.

*Leslie Giles*

## CS degrees pay off

➔ **I TEACH SCIENCE** courses at a four-year university. Our program is difficult (about 30% finish), but all of our computer science graduates get jobs. Most of them have accepted

offers before graduation (Re: “Hottest major on campus? Computer science”; [tinyurl.com/7g68get](http://tinyurl.com/7g68get)). We actually don’t encourage additional companies to come to campus and interview because there aren’t enough students to go around. There is too much employer demand and not enough students are going through the pipeline. The most recent official data showed that there is a 3:1 ratio of job openings vs. people to fill them in this area.

*Ray Pettit*

Waiting for ARIN to run out is like waiting for the last horse to die before buying your first car.

# NETWORKWORLD

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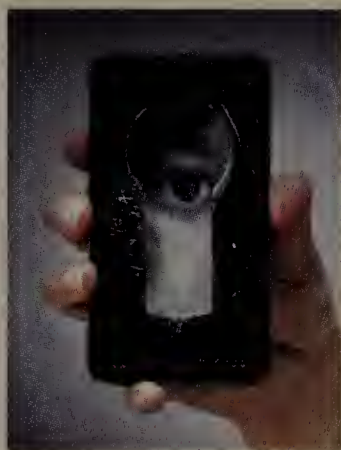


## Cisco data center forecast very cloudy

**GLOBAL CLOUD** computing traffic will grow 12-fold from now to 2015, according to a new Cisco study. The growth represents a 66% compound annual rate, from 130 exabytes to 1.6 zettabytes, which is the equivalent of 22 trillion hours of streaming music, or 1.6 trillion hours of online high-definition video streaming. Cloud is the fastest growing component of data center traffic, which itself will grow fourfold at a 33% compounded annual rate to reach 4.8 zettabytes annually by 2015. Cloud is estimated today to be 11% of data center traffic, growing to more than 33% of the total by 2015. Greater virtualization and improved economies of scale will be key drivers of the cloud transition, Cisco says. [tinyurl.com/csd8xvk](http://tinyurl.com/csd8xvk)

## A spy in your ear

**CARRIER IQ LAST** week denied that its embedded smart-phone application records, stores or transmits personal user information. A number of programmers have been trying to figure out how Carrier IQ's software actually works and what



information it accesses following blog posts by a systems administrator named Trevor Eckhart that purportedly show the CIQ application was logging keystrokes and SMS messages contents. Eckhart sparked the controversy, even though his analysis has received almost no peer review. AT&T and Sprint say

their mobile phones integrate Carrier IQ, but insist the software is used to improve wireless network performance. HTC and Samsung said they were integrating the software into their handsets only because their carrier customers were asking for it. Apple said it included the Carrier IQ software in earlier version of its iOS firmware for devices, but dropped the code from iOS 5. Verizon, RIM and Nokia insist that reports about their devices integrating the tool are false. [tinyurl.com/caot9k8](http://tinyurl.com/caot9k8)

## FCC OKs on-body medical networks

**THE FCC** last week gave the nod for use of wireless networks of microstimulators to treat paralysis and other conditions. The agency gave medical micropower networks (MMN) four blocks of the 400MHz spectrum despite opposition from broadcast engineers concerned about interference. Microstimulators implanted next to nerves can stimulate those nerves through electrical charges, causing muscles to contract and limbs to move. MMNs can link dozens of those stimulators to devices that take in signals from the human nervous system, bypassing areas of the nervous system that have been impaired by strokes or spinal cord or brain injuries. [tinyurl.com/cg3g5az](http://tinyurl.com/cg3g5az)

## Chrome takes No. 2 browser spot from Firefox

### GOOGLE'S CHROME

has narrowly overtaken Mozilla's Firefox as the second most popular desktop browser behind Microsoft's Internet Explorer, which is holding onto its market-leading share, according to one Web analytics firm. StatCounter's monthly statistics for November show IE in the lead with 40.63%



### IT VIDEO

## Rubik's Cube competition helps kids learn algorithms

High schools and middle schools recently worked in teams to solve the cube as quickly as possible, learning memorization skills and other teamwork concepts. [tinyurl.com/cfbzn4t](http://tinyurl.com/cfbzn4t)

of the global market, followed by Chrome with 25.69%, Firefox with 25.23%, Safari with 5.92% and Opera with 1.82%. While Chrome for the first time surpassed Firefox on a global basis, that's not the case in the U.S., where Firefox (20.09%) retains a lead over Chrome (17.3%). [tinyurl.com/cy3pw43](http://tinyurl.com/cy3pw43)

## Office 365 on a roll

**OFFICE 365** is poised to be one of Microsoft's fastest-growing products ever. The cloud collaboration and communication suite is selling eight times faster than its predecessor, the Business Productivity Online Suite (BPOS), and has been particularly successful among small businesses, which make up more than 90% of Microsoft's customer base. Last week Microsoft said it's making Office 365 available to try in 22 new markets, including Argentina, Taiwan and South Africa, as well as rolling out more than 30 product enhancements to the suite. Launched in June, Office 365 includes online versions of Exchange, SharePoint, Office and Lync hosted in Microsoft data centers, and is priced on a per user, per month subscription basis. [tinyurl.com/cbxutka](http://tinyurl.com/cbxutka)



# Cisco to introduce larger Cius tablet next year

BY AGAM SHAH, IDG NEWS SERVICE

**IN THE** first half of next year Cisco will release a tablet with a larger screen than the current Cius, the first move in the company's long-term plans to introduce tablets in multiple sizes, an executive said last week.

The new tablet will be released around the spring season in the U.S., and the screen size will be larger than the 7-inch screen on the current Cius tablet (pictured right), says Chuck Fontana, director of Cius product management at Cisco.

"We're still working through the details of the exact form factor," Fontana says.

The company is looking at multiple screen sizes, but a lot of research is around tablets with 10-inch to 11-inch screens, Fontana says. Cisco is also looking at smaller Android devices with 3.5-inch to 5-inch screens from where users can access videoconferencing, collaboration and virtual desktop tools.

After delays and a long trial run, Cisco's Cius tablet start shipping in July and is targeted at businesses. The tablet has Google's Android 2.2 OS and Intel's mobile processor.

Cius is priced at \$725, higher than the iPad 2, which is priced starting at \$499. The tablet is not available in retail stores and competes with business tablets such as HP's Slate 2, which has an 8.9-inch screen, and Dell's Latitude ST, which has a 10-inch screen.

Fontana described Cius as an "endpoint" device that can be used as a virtual desktop or as a mobile device for communication or collaboration. The device works with Cisco's TelePresence videoconferencing system, WebEx tools and other applications including Quad, a collaboration tool also available for the iPad and iPhone. Virtualization software from VMware and Citrix allows the tablet to run a virtualized Windows desktop. The tablet also provides access to Android Market and Cisco's AppHQ.

Cisco is also working with Intel to upgrade the current Cius to Google's Android 4.0, and the new OS can be expected by fall, Fontana said. He declined comment on whether the new larger screen tablet would come with Android 4.0.

There are no current plans to put Microsoft's upcoming Windows 8 in the Cius tablet.

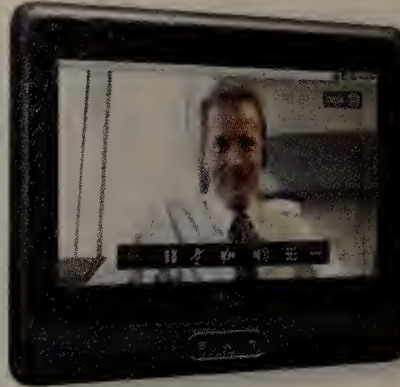
Use of the Cius is growing in the enterprise as applications move to the cloud and businesses increasingly find ways to use tablets, Fontana says. There is a demand for larger screens, so one of Cisco's immediate focus is

to upgrade its tablet lineup.

Larger screens are useful in businesses, especially in dealing with rich media and for those who want wider screens but don't have a dock or a monitor, Fontana says. It will be possible to dock larger-screen Cius devices on desktop phones, and will provide a PC-like experience via secure access to virtual desktops hosted on servers.

"Some people don't want a device that's more mobile, they want something that's an endpoint that's both a videophone and a virtual desktop," Fontana says.

Smaller devices with 3.5-inch to 5-inch screens are also under consideration,



Fontana said. These devices could resemble smartphones in size, but will be smaller cousins of the larger tablets, with access to enterprise collaboration, communication and virtual desktop tools.

For instance, smaller-screen Cius devices could resemble smartphones and

be alternatives to older devices like Cisco's old IP phones which are currently popular portable devices for voice and video.

The company this week introduced a model of its current Cius 7-inch device for AT&T's 4G network. The company will also introduce a Cius for Verizon's LTE network. ■

## RIM to offer multiplatform device management

BY STEPHEN LAWSON, IDG NEWS SERVICE

**RESEARCH IN** Motion is taking on mobile device management for Android and Apple iOS devices as well as its own products, introducing last week the BlackBerry Mobile Fusion product.

BlackBerry Mobile Fusion is designed to simplify the management of phones and tablets that run RIM's current BlackBerry OS and the emerging BBX platform, which is based on the QNX software that currently powers RIM's PlayBook tablet. But Mobile Fusion will also manage devices using the two biggest mobile operating systems, Android and iOS.

The growing number of corporate and employee-owned mobile devices poses a challenge for enterprises that want to let employees choose their own devices, while making sure sensitive data remains secure and business applications uncorrupted. Numerous vendors have weighed in with tools to handle these tasks, including Sybase, Zenprise and FiberLink. But RIM, which largely introduced mobile devices to large enterprises and is still a major player in this market, has not managed other vendors' devices.

When companies allow employees to bring their own smartphones and tablets

into corporate offices and to use them for work, they can no longer dictate a standard platform and build a device management strategy around it. Managing those diverse fleets of devices has fallen mostly to third parties rather than mobile platform purveyors themselves.

Because of its long enterprise experience and reputation for security, RIM may be better suited than its mobile OS rivals to dive into mobile management as a business. But the company also is strongly motivated to make its customers happy, as sales of its smartphones decline and shipping dates for some products slip. Version 2.0 of its PlayBook operating system, originally expected in October, now is set for delivery in the first quarter of next year. The company hasn't even given a firm date for availability of the first smartphones based on QNX.

Other big mobile OS vendors are making strenuous efforts to capture market share from RIM in enterprises. With its planned purchase of Motorola Mobility, Google will also acquire 3LM, which makes software to secure all the apps on an Android phone. The 3LM software is already built into the entire phone lineups of a dozen handset makers, Motorola said last month. Apple has steadily added enterprise-friendly features to iOS, too. ■



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# America's critical infrastructure security response system is broken

BY ELLEN MESSMER

**THE FLAP** over the reported water utility hack in Illinois begs the question: Is the reporting system that the U.S. has set up to identify cyberattacks on critical infrastructure broken and in need of rethinking?

Since the year 2000, the Department of Homeland Security (DHS) has encouraged states and cities to establish so-called "fusion centers" to operate under local control and collect information from the likes of power companies and water utilities about incidents that might have national-security implications.

There are now 72 of these fusion centers in the U.S., which vary in their practices, according to DHS. When one of them, the Illinois Statewide Terrorism and Intelligence Center (STIC), issued a brief report on Nov. 10 titled "Public Water District Cyber Intrusion," it led to a firestorm of controversy, putting what has been a secretive reporting system in the harsh glare of the public spotlight, and highlighting the intrinsic weakness in the way the U.S. critical-infrastructure incident reporting system works today.

The Illinois STIC report said there had been a cyberattack from Russia on a SCADA (supervisory control and data acquisition) system used by an unnamed Illinois water-supply company to control its water pumps, leading to the burnout of a pump as it was repeatedly turned on and off. In addition, the STIC report said an unnamed information technical services company looking at the SCADA system believed the hackers had been going after the SCADA system for several months, trying to get user names and passwords.

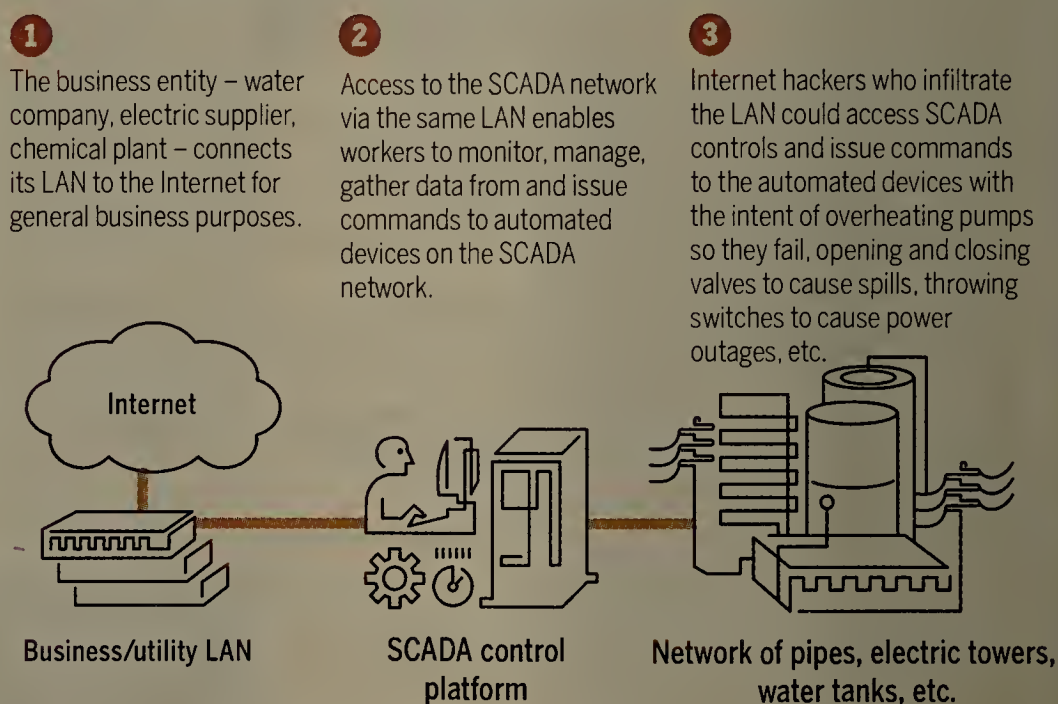
The STIC report was sent on to the DHS for its review, which DHS says is the usual process. But the DHS' Industrial Control Systems Cyber Emergency Response Team (ICS-CERT) later said it was only "made aware of" the report on Nov. 16.

The report, shared among those associated with the Illinois STIC, was expected to remain confidential. But the operator of a utility company associated with the Illinois STIC, who was troubled by this report and looking for advice, shared it with a well-known energy-industry consultant, Joe Weiss, head of Applied Control Solutions.

When Weiss mentioned the report in his

## Anatomy of a SCADA attack

Supervisory control and data acquisition (SCADA) networks are set up to gather telemetry data from automated devices on networks and to issue commands to them. This diagram shows the widespread general threat posed by the Internet to these networks, most of which were designed to operate in isolation and so are lacking in security and forensics.



blog a media firestorm ensued, with the *Washington Post* and other news sources describing it as perhaps the most significant cyberattack on U.S. critical infrastructure.

Once the media blitz erupted, the DHS and FBI took to publicly describing how, in coordination with ICS-CERT, they had sent a team off to the Illinois water facility. The feds were the first to name it as the Curran-Gardner Townships Public Water District in Springfield, Ill., which serves just over 2,000 customers.

ICS-CERT on Nov. 23 issued a bulletin that said once it had received the Illinois STIC report on Nov. 16, the organization "reached out to the STIC to gather additional information. ICS-CERT was provided with a log file; however, initial analysis could not validate any evidence to support the assertion that a cyber intrusion had occurred."

Curran-Gardner itself declines to discuss the matter, but the DHS and FBI now says,

"After detailed analysis, DHS and the FBI have found no evidence of a cyber intrusion into the SCADA system of the Curran-Gardner Public Water District in Springfield, Illinois."

The *Washington Post* reported that, too, and later quoted unidentified sources saying the remote SCADA access was from an unnamed contractor for Curran-Gardner that happened to be in Russia at the time.

That contractor, Jim Mimlitz, founder and owner of Navionics Research, has now come forward and publicly said he was in Russia on vacation in June and logged into the SCADA system at the request of Curran-Gardner. He said he didn't mention to Curran-Gardner he was on vacation in Russia.

It is unclear how that activity in June came to be perceived as a November hacking attempt in the Illinois CERT report, which Weiss read verbatim to *Network World*. The report is thin on details about the supposed



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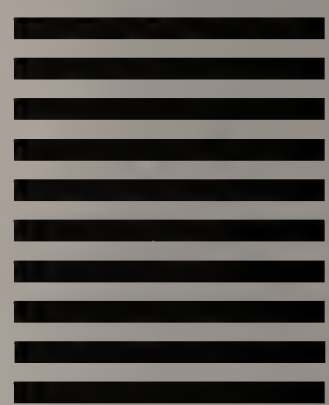


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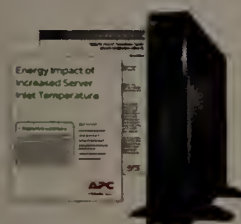
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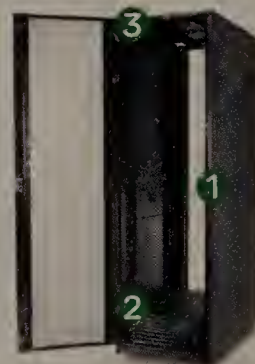


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A dark, grainy night scene of a city street. In the center, a window in a building is brightly lit, showing the silhouettes of two people. The rest of the scene is dark and blurry, suggesting a long-exposure photograph of a city at night.

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## TREND ANALYSIS

intrusion, the problems with the SCADA system and what actually happened.

The DHS ultimately concluded: "There is no evidence to support claims made in initial reports — which were based on raw, unconfirmed data and subsequently leaked to the media — that any credentials were stolen, or that any vendor was involved in any malicious activity that led to a pump failure at the water plant. In addition, DHS and the FBI have concluded that there was no malicious traffic from Russia or any foreign entities, as previously reported."

But the DHS does add: "Analysis of the incident is ongoing and additional relevant information will be released as it becomes available."

Several security experts say they find it reprehensible that a SCADA contractor would remotely access a U.S. facility's SCADA system from Russia.

"It's without question a poor security practice, probably the most distressing information out of this investigation," says Andre Eaddy, director of cybersecurity portfolio solutions at Unisys. "Most organizations would limit access inbound and outbound to certain countries, especially to certain countries like Russia or China." That's because there are so many malware-related attacks associated with them that it isn't worth the risk, and even taking a laptop with contractor information there would not be considered good security, he says.

"It is shocking" a contractor would directly access a SCADA system from Russia, Weiss says. But the bigger problem is that "we have no control system forensics and logging," meaning it is hard to get an accurate picture of what happened and where and when it happened after any type of suspected breach.

Weiss says the entire episode, in which the Illinois STIC fusion center issued a very direct report that gave no indication it was preliminary or unproven and which had such explosive information, shows how broken the U.S. critical-information reporting system is.

"What Illinois put out is scarier than hell," he says. It's hard to understand how it could be a week or longer for ICS-CERT, DHS and the FBI to step in and say the report was wrong. He also points out that the various fusion centers all report different things that seem to circulate only locally before information goes on to DHS in Washington. He wonders why fusion centers put out reports without making it clear they're not considered validated.

Weiss thinks the Water-ISAC, a group coordinated by the federal government and the water utilities to share information, should have been informed about the Illinois STIC report.

Some in industry think Weiss stepped out of bounds to have even publicly mentioned the Illinois STIC report, but Weiss says he doesn't have any official connection to it and is under no particular obligation to keep the document confidential.

On Nov. 23, ICS-CERT, which works within DHS, issued a security advisory about the "Illinois Pump Failure Report."

Without mentioning Weiss by name, ICS-CERT pointed out the impact that public discussion had on its usual processes, which are typically secret. "Publicly disclosing affected identity names and incident information is highly unusual and not part of ICS-CERT's normal incident reporting and triage procedures. In this particular case, because unconfirmed information had already been leaked to the public, ICS-CERT and the asset owner/operator felt it was in the best interest of the community to collaboratively analyze all available data and disclose some of the findings."

DHS sources say the general assumption about the fusion centers is that they are simply places for gathering information and that DHS is the ultimate authority for the validation of that information. Fusion centers include not just critical infrastructure companies but private-sector partners as well. For instance, Cisco says it belongs to many of the fusion centers and would immediately supply information to them if a serious malicious attack was detected.

DHS provides some funding to the fusion centers through FEMA grants, but expects the state and local authorities sponsoring a center to carry the basic fiscal and management responsibility. DHS acknowledges the fusion centers vary significantly in their activities and practices, though since 2008 there has been a push to try to establish basic guidelines and common toolsets.

However, DHS at this point isn't able to explain exactly what anomalies or security incidents critical infrastructure companies are required to report.

"Right now, it's not a good model," says Gartner analyst John Pescatore of the fusion centers. Not only could the intelligence-gathering function be improved, but there should be more "proactive information coming from the other way" that would help private industry definitely know about real threats. ■

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## Citrix supports more workers with lower budget

**C**itrix CIO Paul Martine is the poster child for everything that Citrix markets to other CIOs. From server and desktop virtualization to cloud computing and consumerization, Martine is an early adopter of the entire Citrix product line. As a result, he says he has been able to slash millions of dollars from his IT budget while supporting 25% more employees added during the last 18 months. *Network World* Senior Editor Carolyn Duffy Marsan recently interviewed Martine to get the details. Here are excerpts from that conversation:



### How are you reorganizing your IT department as you centralize, virtualize and adopt cloud-based applications?

When we look at software as a service, we're looking for applications that can meet our technical requirements and are a benefit to us in terms of reduction of costs or speed to market. We still run some applications in-house. We use SAP for financials, supply chain and the HR portal. There was a talent management project underway where we looked at building it in SAP or going with a SaaS provider, and we actually went with the SaaS provider. We use a SaaS application called Authoria [now re-branded as Peoplefluent] to deliver that application to the whole company ... as if it were written to our own SAP portal. For us, it was less expensive and faster to market to use SaaS, which is a complement to the premises-based applications.

You have to really look at the SaaS application and can it meet those criteria of security, compliance, reliability, resilience and continuity and complement a premises-based application. Out of 125 applications we run, 25 are Web or SaaS applications. When we find those SaaS applications that are a benefit as a stand-alone like Salesforce.com that we use for lead management and sales, we integrate them into our other applications.

### Right now, 20% of your applications are SaaS applications. Do you expect that percentage to increase in the next 18 to 24 months?

Sure. We're going to continue to look at SaaS where it makes sense, where it complements one of our premises-based applications or a stand-alone application. You can even integrate multiple SaaS providers and you can build out the infrastructure that way. I don't really care

where [an application is] delivered from as long as it meets all of our requirements.

### How has the shift to SaaS affected your staffing levels and the expertise you need in-house?

The expertise we need is still the same. Those writing integration code and those supporting our colo architecture remain the same skills, but they are integrating applications that are not sitting in our data centers. From the application development team, there are subtle differences. They are not developing that application. They are working with the SaaS project team to get their application up and running. They are no longer managing contractors doing development work because the development work is already done. We want to deliver SaaS applications as close to out-of-the-box as possible.

### How has the size and structure of your IT department changed over the last 24 months?

It's gotten a little bit smaller. Our application development team is about 150 people. The infrastructure side is about 150 people. We've probably shrunk by 25 or 26 people over the last few years. We've also done virtualization around the desktop, so now we are delivering desktops from the data center. I took the desktop engineering team, and some of them moved into the data center team. We've really been able to manage virtual desktops out of the data centers. We've built little storefronts — think of them as Apple Genius bars — and we placed them in high-traffic areas in our main locations to provide users with walk-in help. If somebody has a problem with an iPad, a smartphone or a laptop, they can get one-on-one interaction from our people. Users seem to like that a lot better.

### What metrics are you using to track how your movement to SaaS applications is benefitting the company?

One of the main metrics we use is the number of employees we support. Citrix has 6,800 employees worldwide; 1,400 of them we hired in the last 18 months. When I look at my overall costs to run IT over the same time, our costs actually have been reduced. Every time a person is hired in the company that impacts my costs for hardware, storage, licenses and facilities. Yet from an IT perspective, we've been able to deflect the costs of supporting an increase in employees. I will spend \$6 million less next year on IT than this year. I spent \$2.5 million less in 2011 over 2010. With the movement to SaaS applications, some of the dollars are going to move from capital expenses to operating expenses. But in all the numbers — both operating expenses and capital expenses — there's been an overall reduction. That's the big metric that we follow.

We also measure the typical IT metrics, such as performance, reliability and the number of [help desk] incidents. Year to date, as of November, we're seeing a 29% decrease in incidents. With desktop virtualization, you're really simplifying what you're doing. You're delivering desktops and applications from the data center. You have one copy of the application, one copy of the desktop, and you deliver that out to multiple employees. All of my applications live in one data center in Miami, and I deliver that around the globe to 80 offices.

### What role does outsourcing play in your IT infrastructure and how is that changing?

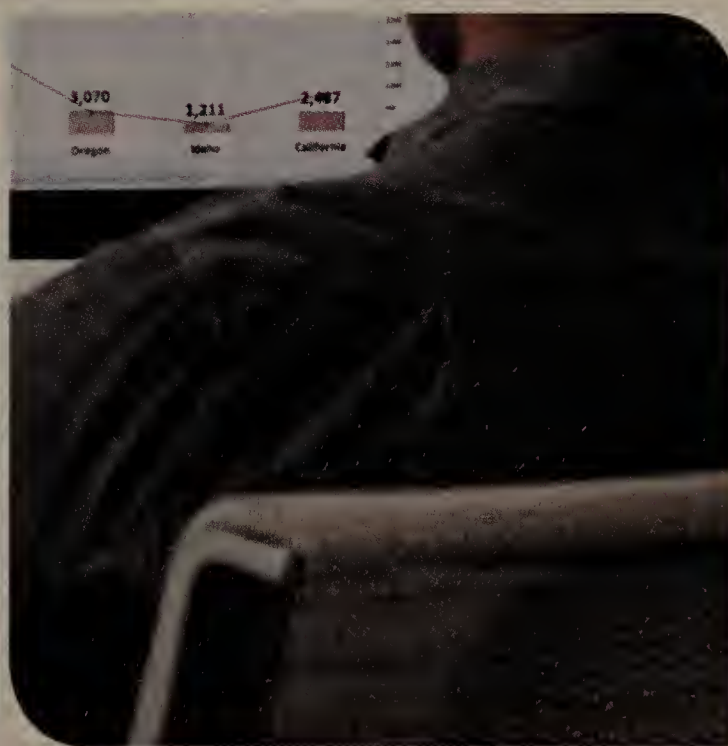
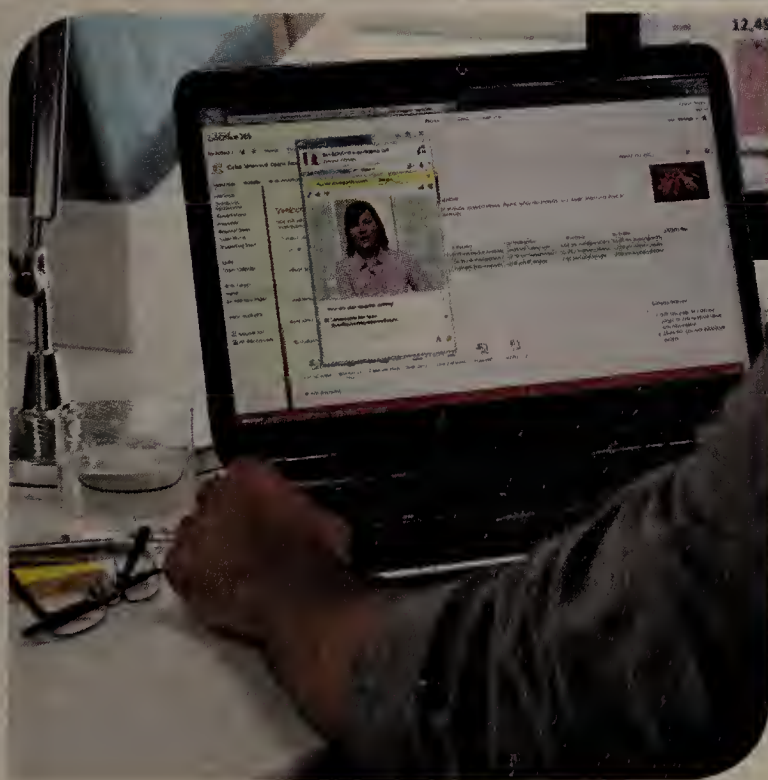
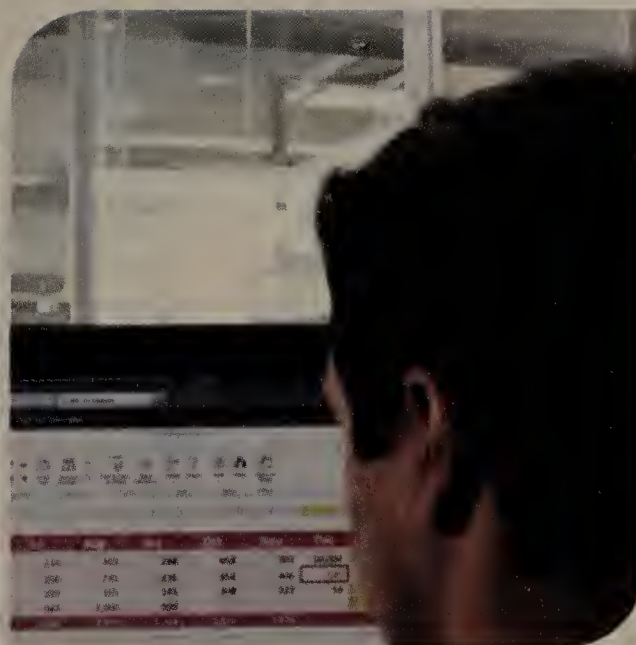
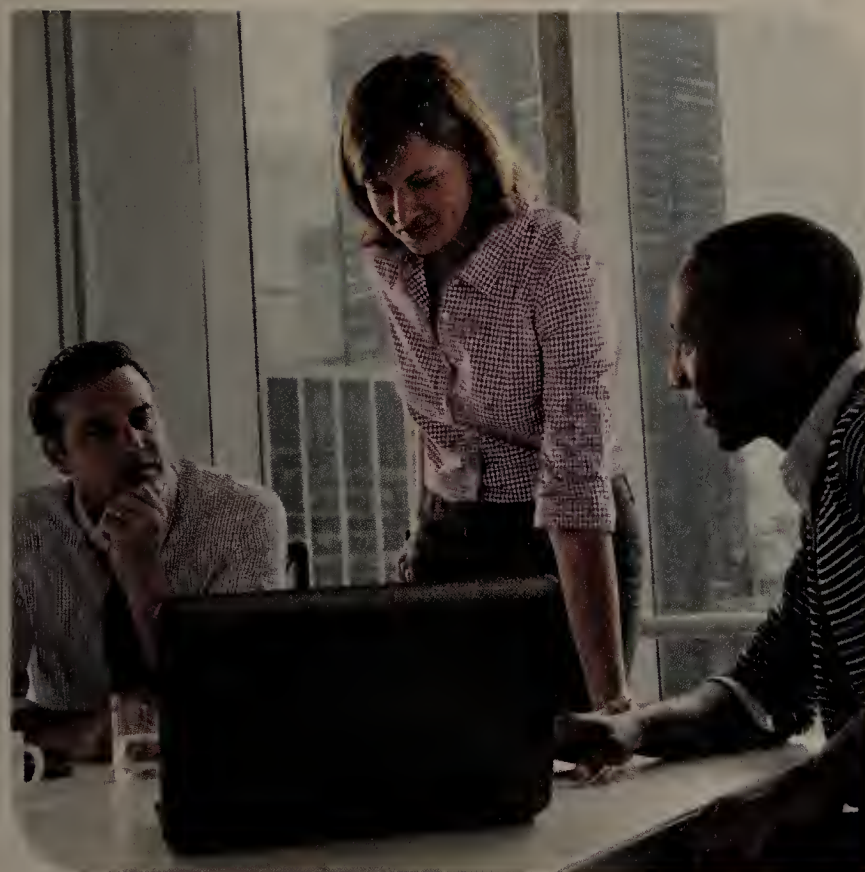
You can call SaaS outsourced because we don't do the development work. So in lieu of paying a team of consultants or my own development team to develop an application, you're paying an operating expense; you're paying a monthly fee. It's a bit more consistent, and there aren't big spikes of capital. We can manage more projects because a handful of them are SaaS. That frees up my team.

### What types of talent are you most interested in having on staff: deep technical skills or deep management skills? Why?

We have a complement of both. We have business relationship managers at either senior



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manager or director level. Those are the interface to all the functional departments within Citrix. We liaison with those functional departments as they go through the capital cycle for the IT projects for next year. Our business relationship manager works closely with the functional department head, starts to gather information, and starts to build out a plan for each department. So we have those business skills. But we still need the technical skills.

### Are you doing anything new to develop the talent you have in your department?

It's certainly a challenge. One of the things that Citrix is doing as a whole is looking at the design for products and making them more usable. My development team has just gone through design school. We just revamped our license management system using those design school principles. We're taking a step back and not just doing an upgrade to add features, but to make it simpler, easier and more intuitive for the user. It's a different skill set.

### How are you handling the maintenance and operations of IT systems, networks and data centers?

The maintenance remains very, very similar to what it was in the past. Part of our criteria is to be able to monitor SaaS applications. We have an operations center in Fort Lauderdale and in Bangalore to get 24-by-7 monitoring. The maintenance on SaaS applications is done by the providers. Salesforce does three or four updates a year that are not disruptive to me. My team can focus on the premises-based applications. We keep our applications current. Tech currency is very important to me. It allows us to leverage the newest, latest, greatest applications. Our team focuses on the premises-based applications. We keep them no further than two versions behind. That includes SAP, Siebel, Oracle and my Microsoft stack. My SaaS is kept current by my providers. Then the integration team has a good platform to work with the newest and latest technology around my service-oriented architecture. I want my applications to provide or consume a service from one another.

Our data centers are colo facilities. In Miami, we run Citrix out of a 1,600-square-foot cage at a Terremark data center. Our data center team accesses all of that remotely. We maintain all of those applications, and we maintain that hardware. We've been in the same size data center for six years, even though the company

has grown 200%. That's another important metric. With the data center, your real expense is not hardware; it's power, cooling and space inside the data center. We've been able to hold that expense.

We have a global MPLS network. We migrated to that about three years ago. That's been great for us. We moved to one provider, and they are doing a very good job with it. If I have a big video broadcast out of our Pacific office, I can allocate the bandwidth for that. Our network capacity hasn't really changed too much. A lot of the SaaS applications are coming over the public Internet. We haven't had to change the size or shape of our network unless we add a location. We're relying on the service provider to do that. Not having a data center in our building, we take our network provider's equipment and terminate it in the colo data center. We can't be more reliable or secure than that.

## We've been in the same size data center for six years, even though the company has grown 200%.

We're taking out a lot of our network infrastructure in the buildings and going wireless. In Fort Lauderdale, the application delivery team has 150 people who are pure wireless. We're also moving toward open seating, where nobody has assigned seating. One of our buildings is all wireless, all soft phones. Downstairs is a project room with writable walls and writable desktops. It's a real collaborative environment. People can flow from one place to another, and they don't have to worry about the wiring in the walls. It's very, very flexible.

### How are you and your department helping Citrix increase speed to market or drive revenue?

There are a few subtle things we do. I spend 20% of my time talking with customers. They want to talk to me about how I am doing things [like desktop virtualization.] The sales and marketing organization is constantly ping me about giving talks about how I support 6,800 employees around the globe with Citrix products. We keep the technology in the hands of the sales

team. They were the first ones to have virtual desktops. They are on the most current version of the Windows operating system and the most current version of our applications. We even have the beta version of our applications delivered to them.

### How will your adoption of cloud computing evolve over the next 18 months?

We're going to see more of the follow-me data. That's one of the things we really want to achieve. Your apps can follow you anywhere. Your desktop can follow you anywhere, and now your data can follow you anywhere. We're achieving this through the recent acquisition of ShareFile. We need to do some work with ShareFile; we need to ensure the security of it. We need to provide the SSL VPN capability. It's more of rounding out that offering. So I'll be able to take my iPad and travel wherever I want and bring up my XenDesktop, bring my data with me and be productive while traveling. It's kind of like a personal cloud.

### You've seen IT cost reductions over the past few years despite an increase in employees. How will you handle that dynamic in the future?

Citrix is going to continue to grow as it has in the past. If Citrix wants to grow another 1,400 employees, and I can keep my costs flat, then we are doing a great job. We've done a lot of acquisitions recently, so day one is a big day for us because we have to have all of the people on-boarded. We provide a virtual desktop on day one, with all the HR applications and email set up ahead of time. So when we do mergers and acquisitions, my team goes out there and has responsibility for getting them operational. I don't care what device they have: laptop or tablet. I'm just going to provide them with a virtual desktop, and they can be up and running on day one. That's part of our speed-to-market. All of our employees are on Windows 7 or Windows 8. We want to move forward with more of an open-seating and work-anywhere style environment. More departments are interested in that.

### What are your plans regarding IPv6?

It'll be an ongoing project. I'm not real concerned about it. IPv4 will be here for the next 20 years. As newer technologies come out, they will be IPv6. It's just part of our natural growth and changing technology of the Internet. All of our commercial sites — citrix.com, mycitrix.com — are IPv6 compatible. We'll step through upgrading the rest of the infrastructure to IPv6. I'm not in a great big rush to do it. I don't see a lot of risks. But certainly, IPv6 is in our 2012 plan. ■



For a full version of this Q&A, go online.  
[tinyurl.com/c5njzfk](http://tinyurl.com/c5njzfk)



## VIEWPOINT



### Steve Nye

EXECUTIVE VICE PRESIDENT,  
PRODUCT STRATEGY AND  
CORPORATE DEVELOPMENT,  
INFOBLOX, INC.

Steve Nye is the Executive Vice President of Product Strategy and Corporate Development for Infoblox, Inc. He is responsible for formulating the Company's longer-term strategy for portfolio and market expansion. Within his organization he directs all product management, marketing and business development activities. He oversees corporate development, which includes strategic alliances, both technical and marketing, as well as M&A activity.

#### FOR MORE INFORMATION

on managing your company's virtualization, mobility and IPv6 challenges, check out our Tech Dossier "A Better Way to Run Your Network: Dynamic Network Services" at [www.networkworld.com/infoblox](http://www.networkworld.com/infoblox)

Infoblox 

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## Maximizing Your IT Resources

### Network Service Automation Rightsizes IT Staff and Delivers "Time to Value"

#### What is the biggest challenge you see driving IT departments these days?

Our customers and business partners say complexity is on the rise, which is putting more demands on IT to respond faster to business changes. However, because their budgets and staff are constrained, most companies cannot move quickly. They need help with scaling in an environment in which technology is moving faster than IT talent. We think new solutions that help manage the growing chaos surrounding IP initiatives will help increase network availability by reducing errors or delays in rolling out new services.

#### What is the impact of virtualization on network staff?

Virtualization breaks the traditional "one server, one application" architecture, and that creates new management challenges. For example, troubleshooting and seeing which virtual machine is connected to which port have become more difficult. Businesses need new discovery and visualization tools that automatically collect configuration information and automate repetitive and high-response-rate chores such as assigning IP addresses and server names in a virtual environment. The task of issuing IP addresses and names for virtual machines should happen just as fast as a virtual machine can be provisioned. The network team in a virtualized environment must be as dynamic as the server team's ability to provision new systems. This type of automation is a critical part of any private cloud strategy.

#### How does the influx of new mobile consumer devices correlate with the need for more network automation?

IT managers are often not informed when new mobile devices come into the company. Employees bring them to work, or business units buy new systems because they do not want to wait for funds to be allocated to fulfill a critical business need. The IT department needs to know what is being attached to the enterprise

network, because the impact of these devices can be significant. This shift to a more mobile and dynamic computing environment puts a strain on mission-critical network services such as Domain Name Service (DNS). As a result, IT needs simple-to-use, intuitive tools that monitor network activity while proactively managing and securing connections from a single central console.

#### How does the movement to IPv6 affect network staff?

The migration has already begun. T-Mobile is delivering IPv6 support in its phones, and these new IPv6 devices still need to connect to IPv4 networks. In the past, address management was done on spreadsheets, but 128-bit IPv6 addressing brings an entire new set of challenges. When you add virtualization and cloud to this challenge, managing IP addresses with just a spreadsheet becomes impossible. IT teams will need automated network services.

#### Where should a company start and how can you gauge success?

Automation is a new "big idea." To some, it means ripping and replacing—or making significant investments in professional services and/or integration work. At Infoblox, we strive to make automation compelling by demonstrating that we can make adoption simple. By using automation, companies can reduce a 40-step process to a few clicks of a mouse. As a result, companies can make huge productivity gains and save money—many of our customers see an immediate increase in network availability and savings of millions of dollars annually by embracing automation.

Once companies see such results, they can expand their use of these tools and dramatically increase IT staff productivity. Infoblox's heritage is in automating network services such as DNS and IP address management. We anticipate that both automation and next-generation network services will be key elements powering the next 10 years of IT.



## TOOLS

# Cracking MD5 ... with Google?!

**H**ere's a piece of news that will worry anyone interested in security (which should be pretty much everyone who reads *Network World*): A programmer by the name of Juuso Salonen has created a Ruby script called BozoCrack that cracks MD5 hashed passwords with remarkable success and with very little effort.

Before we go any further, let's have a little background: Computer systems need a mechanism to authenticate users and processes so that the good guys can get in to do work and the bad guys are locked out.

The most common authentication method is to use a name and a password, but if you were to store the password in plaintext on the system you would run the risk that passwords could be exposed. A common solution is to not store the password at all but instead keep something called an MD5 hash of the password.

MD5 is the fifth version of the Message-Digest cryptographic hash "function" created by the renowned computer scientist Ron Rivest. An algorithm implementing MD5 takes in strings and outputs 128-bit hash values that have several interesting attributes.

Those attributes: Any input string can be hashed (the string can be of arbitrary length and character set) in a reasonable amount of time and it is computationally impossible in practical terms (unless you have years and access to a supercomputer) to generate a string with a specific hash value, make a change in a string without

changing the hash value, and find two different strings with the same hash value.

So, if you take a string such as "mysecret-password" and run it through an MD5 implementation you get the hash value "4cab2a2db6a3c31b01d804def28276e6."



Mark Gibbs' Gearhead

values. As the relationship of input string to hash value and vice versa isn't predictable, you have what is called a "one way" function; you can go from string to hash value but not from hash value to string.

In practice, when a user logs in to a computer, the password's MD5 hash value is calculated on the fly, the account name looked up in a database, and the saved and calculated hash values compared. Only if the values match is the user allowed access.

The problem with the MD5 function is that it has been shown to be "breakable" through several types of sophisticated attacks. But as these attacks are technically very complicated to perform, MD5 hashes are still widely used.

Alas, the BozoCrack algorithm adds a whole new dimension of vulnerability to MD5, as Salonen commented: "BozoCrack is a depressingly effective MD5 password hash cracker with almost zero CPU/GPU load."

How does BozoCrack do its voodoo? The author explains: "Instead of rainbow tables, dictionaries, or brute force, BozoCrack simply finds the plaintext password. Specifically, it googles the MD5 hash and hopes the plaintext appears somewhere on the first page of results. It works way better than it ever should."

Why did he create it? "To show just how bad an idea it is to use plain MD5 as a password hashing mechanism. Honestly, if the passwords can be cracked with this software, there are no excuses."

Thus, once again, does the power of Google make fools of us all. ■

Gibbs is secure in Ventura, Calif. Settle your hash at [gearhead@gibbs.com](mailto:gearhead@gibbs.com).

Honestly, if the passwords can be cracked with this software, **there are no excuses.**

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Change a single character and the hash value will also change and do so unpredictably.

With 128 bits you have  $3.4 \times 10^{38}$ , or around 340 undecillion possible hash



## GADGETS

# Two Android tablets, different goals

### THE SCOOP

## Xoom 4G LTE tablet

by Motorola and Verizon Wireless, about \$300 (with two-year contract)

► **What it is:** The 10.1-inch display tablet from Motorola recently got a 4G LTE upgrade from Verizon Wireless, providing it with faster network data speeds than before. The device runs on a dual-core 1GHz processor, uses Android 3.2 (Honeycomb) OS and features a 2 megapixel front camera webcam and a 5 megapixel rear camera for photos and videos (up to 720p recording resolution and playback). The tablet features 32GB of internal memory storage, with microSD card support (sold separately) for up to another 32GB.

► **Why it's cool:** Certainly, the 4G LTE network gives you faster data downloads and uploads than previously — in my tests I averaged 16.12Mbps of download speed, and 5.59Mbps of upload speed. For travelers where 4G LTE coverage is located, this can provide for great productivity in getting files and accessing websites quickly. The larger screen makes it appealing to users who want more real estate for Web browsing and app usage (although I prefer the smaller ones for e-books). Along with the iPad and Galaxy Tab 10.1, the Xoom 4G LTE should be on your short list of tablet choices.

► **Some caveats:** May be less useful for users not in 4G LTE coverage areas. Data costs for 4G LTE access may also turn some users away.

► **Grade ★★★★★ (out of five)**

### THE SCOOP

## Galaxy Tab 7.0 Plus

by Samsung, about \$400

► **What it is:** This is an upgrade to the original 7-inch Galaxy Tab Android tablet from Samsung, with features such as a 1.2GHz dual-core processor, Android 3.2 Honeycomb OS and support for HSPA+ wide-area networks (although the unit we received was a Wi-Fi only model). Other hardware features include 1GB of RAM, 16GB or 32GB of on-device storage (depending on model), support for microSD card

The Galaxy Tab 7.0 Plus is lighter than a larger tablet.



Keith Shaw's Cool Tools



for extra memory (up to 32GB), 1,024 by 600 WSVGA resolution display, Bluetooth 3.0, 720p video camera recording (back camera is 3 megapixel with auto-focus and LED flash), 2 megapixel front camera for webcam chatting and a video player with 1080p support.

On the software side, the tablet supports Google Mobile Services (Google Talk, Gmail, Calendar, YouTube, Google Maps, Latitude, Places and Google Maps Navigation), and the Samsung Hubs offerings (Social Hub, Music Hub and Readers Hub). The unit also comes bundled with the Peel Smart Remote application, a great interactive TV guide, as well as built-in IR that lets you use the tablet as a universal remote control for your home entertainment system.

► **Why it's cool:** The device is lighter than a larger tablet, although it's still not as light as a smartphone that you can fit in your pocket. Using this in the living room, though, was a good fit, for controlling the TV or playing a quick game of Angry Birds. The size compares to e-readers like the Amazon Kindle or Barnes & Noble Nook, making this a good tablet for book reading. The Samsung Social Hub app worked well at combining social feeds from Facebook, Twitter, LinkedIn and even email into one overall view, plus I could post an update on one service and have the app update the other social sites.

► **Some caveats:** Users who like larger tablets such as the iPad or even the 10.1-inch Galaxy Tab may not like the smaller size of this display — surfing websites, for examples, likely requires zooming in more than with a larger-screen tablet. Also, the unit we tested was Wi-Fi only, which limits the locations where you can use the device.

► **Grade ★★★★★ (out of five).**

Shaw can be reached at [kshaw@nww.com](mailto:kshaw@nww.com). Follow him on Twitter: @shawkeith.



ENTERPRISE CLOUD SERVICES \\\ THE VENDOR LANDSCAPE

# CLOUD COMPUTING

# DISRU



NONTRADITIONAL PLAYERS  
LIKE AMAZON AND GOOGLE  
**SHAKE THINGS UP,**  
BUT ENTERPRISE MAINSTAYS  
LIKE MICROSOFT AND VMWARE  
MAY GET THE LAST LAUGH

COVER AND INSIDE ILLUSTRATION BY GARY



# UPTS

## THE VENDOR LANDSCAPE

BY CHRISTINE BURNS

If you think cloud computing is a disruptive force within the enterprise, just imagine what the cloud is doing to the vendor landscape. The sheer number of cloud players — or companies that claim to be cloud players — is staggering. By some estimates there are more than 2,000 software-as-a-service (SaaS) companies alone. At this early point in the cloud revolution, there are certainly front-runners, but the field is wide open.

For example, the marquee SaaS player, Salesforce.com, owned a paltry 8.7% of the total SaaS market, according to a 2010 IDC report that tracked 84 vendors. Other big names — Intuit, Cisco, Microsoft, Google and Symantec — were below 5% each. That leaves scores of other competitors with tiny market shares today, and no place to go but up.

Infrastructure as a service (IaaS) has more than 30 major players, both pure-play outfits that provide pay-as-you-go, on-demand compute services, and those rising into the cloud from the traditional managed services realm. And Forrester Research is watching at least 40 platform-as-a-service (PaaS) providers that say

they can help developers build cloud apps.

To further muddy the waters, many vendors are extending their cloud offerings across the neat SaaS, PaaS and IaaS boundaries.

“It’s true that most of the disruption caused by cloud computing relates to enterprise [operations] and IT. But it’s also been pretty disruptive to the vendor community as well,” says David Mitchell Smith, vice president at Gartner.

Smith believes that a tremendous shakeout will occur over the next year or two. He predicts that by 2013 a small handful of vendors will emerge as leaders delivering both enterprise systems and cloud services.

The two names on Smith’s short list are



Microsoft and VMware.

Smith argues that Microsoft made a seismic shift to a SaaS delivery model in 2008 and has since delivered Microsoft Office365, SharePoint Online and Microsoft Dynamics CRM Online. In the PaaS arena, Microsoft is pushing its Azure platform of AppFabric, SQL Azure and Windows Azure. And, Microsoft is making headway in pushing Azure down into the IaaS space as well.

VMware's vSphere hypervisor and management software has long provided trusted virtualization capabilities in the enterprise. VMware is also making a strong IaaS play by building a network of vendors that use vCloud to deliver cloud compute services.

And VMware has various PaaS irons in the fire. There's its own vFabric PaaS platform. Plus, the company launched CloudFoundry, an open PaaS platform housed at [www.CloudFoundry.org](http://www.CloudFoundry.org), where developers can contribute to collaborative open source projects. And there's a hosted PaaS platform operated by VMware at [www.CloudFoundry.com](http://www.CloudFoundry.com).

"There are no guarantees in a market this size, but we see [Microsoft and VMware] as the companies in the best position now," Smith says.

### The SaaS landscape

SaaS is the most mature cloud layer and, in fact, existed well before the term "cloud computing" gained prevalence, says Robert Mahowald, research vice president of SaaS and cloud services at IDC.

Mahowald makes these two observations about the state of SaaS today: Most enterprises are looking to SaaS for "net new" applications, not as a replacement for existing apps. And many software vendors are developing their products to be consumed via the cloud first, and for on-premise consumption secondarily, if at all.

IDC says the 2010 SaaS market rang in at \$16.6 billion, a figure that represents three-quarters of all IT-based public cloud revenue. IDC predicts that by 2015, worldwide SaaS revenues will skyrocket to \$53.6 billion annually.

"The SaaS market has solidified because it

just makes financial sense for both the provider and the consumer. That combination always drives adoptions," says Robert K. West, founder and CEO of Echelon One, an IT security and risk management consultancy.

Vendors with an edge today tend to be those that developed their products to run natively in the cloud. They were built to take advantage

of the cloud's elastic nature, to be sold on a usage-based model, have multi-tenancy as a basic tenet so that security is constructed accordingly, and have worldwide reach and a resilient infrastructure underneath the covers.

Companies held in high regard for their SaaS offerings include Salesforce.com (CRM), Workday (HR and financial management), Google (desktop productivity), Concur Technologies (travel and

expense management) and NetSuite (ERP).

That's not to say that the traditional enterprise software giants such as SAP and Oracle are out of the race (Oracle does lead in one cloud category, SaaS-based business analytics). But they are playing a bit of catch-up. Some of the tension between those two camps came to the fore in the recent dustup between Salesforce's Marc Benioff and Oracle's Larry Ellison.

"The SAPs and Oracles of the world are trying to adapt their existing software to the cloud, which is extremely difficult and time-consuming," says Joe Coyle, CTO of Capgemini North America, a consulting and outsourcing firm that helps enterprises deploy cloud services. He argues that the process of putting these applications in the cloud is not difficult, but getting them to take advantage of the elastic nature of the cloud is.

"Getting an SAP application to know there is more compute power available when it needs it, is the challenge," Coyle says. Until those applications are reworked to understand what is dynamically available to them, they will lag behind the SaaS leaders, Coyle says.

Paul Turner, senior product manager at NetSuite, which has 10,000 customers using its SaaS-delivered ERP software, says there are several telltale signs of a "false cloud" application. Turner says a native cloud application is completely Web-based.

Second, the service must offer a customization layer that allows enterprise IT to make the tweaks to suit its needs, and those changes must migrate seamlessly with each upgrade to the service. And finally, Turner argues there must be a high level of transparency about any downtime and security issues.

### SaaS begets PaaS

Many of the leading SaaS players — Salesforce.com, Google, NetSuite and Workday — are trying to solidify their positions within their market segments by developing PaaS environments for third-party ISVs.

For example, Salesforce launched Force.com, a PaaS offering built to support its SaaS service; then bought Heroku in order to provide a more open PaaS service. The company claims 200,000 apps built on the Force.com platform.

"We're adding developers daily," says Byron Sebastian, executive vice president of platforms at Salesforce. The hot area is mobile applications running in the public cloud, he says.

The hurdle Sebastian encounters when pushing PaaS into the enterprise is inertia. "We get a lot of pushback from folks who are just used to doing business the old way," Sebastian says.

A second segment of the PaaS market comprises general purpose development platforms that support multiple languages and cloud infrastructures, says Krishnan Subramanian, an independent industry analyst and blogger at [www.cloudave.com](http://www.cloudave.com).

Microsoft's Azure and Google's App Engine are leaders in this category, Subramanian says. The hot startups are CloudBees and Engine Yard, he adds.

And Subramanian believes VMware's CloudFoundry shouldn't be counted out, as the field shakes out over the next 18 to 24 months, because it espouses the open source approach popular with the developer set and cash-strapped startup software companies.

But it's still very early in the game.

Forrester analysts John Rymer and Stefan Rein describe the PaaS market as sprawling, fast-changing and very immature. There's little agreement on what comprises a PaaS in the first place, most PaaS vendors are small, some of the bigger ones have relatively immature products, and other major vendors like IBM, RedHat and Oracle have only recently entered the market.

Forrester divides the PaaS world into four categories, with some vendors competing in multiple segments.

In the largest group, software developers are allowed to use their current tools of choice





Do I have to re-write or  
modify my applications?

How do I know if  
my cloud is secure?

Can I get flexible role-based access control  
synchronized with my enterprise directory?

How can I ensure  
my CPU and memory  
are guaranteed?

Can I dynamically add memory and  
CPU to a cloud VM while it is running?

Can I get virtual layer  
2 networking and a  
stateful virtual firewall?

Can I move applications back  
and forth to the public cloud?

How can I ensure global  
consistency across cloud  
service providers?

Can I get predictable service costs that  
still allow me to scale when I need to?

How can I get the cost benefits of  
multi-tenancy but still access dedicated  
infrastructure when I need it?

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locally and then push code out to the cloud. Playing are ActiveState, Appian, Force.com, Google, LongJump, Magic Software, Microsoft, NetSuite, OutSystems, Servoy, Tibco, Vaakya, VMware, WaveMaker and WSO2.

Then there are environments where everything happens in the cloud. The players here are Appian, Cordys, Force.com, Intuit, TrackVia and Wolf Frameworks.

Some companies target business experts, not “coders.” Caspio, Cordys, ISTools, Mendix, OrangeScape, WorkXpress and Zoho provide tools for creating applications without coding in order to speed up app delivery times.

The last category allows developers to use whatever tool they want to build their cloud applications and the platform tackles the deployment, scaling and management of these apps in the cloud data center. The players here are Amazon, Appistry, Apprenda, CloudBees, Cloudsoft, Engine Yard, GigaSpaces, Heroku, IBM, Joyent, Microsoft, Red Hat, Standing Cloud, Techcello and VMware.

Rymer notes that enterprise IT should act cautiously when it comes to PaaS because “startups are risky and big vendors move slowly and may use their PaaS offerings simply as calling cards to sell their current products.”

Rymer says the two companies likely to enjoy long-term success in the PaaS market are Microsoft and Salesforce. “Every other vendor is a long-term risk,” he adds.

If enterprise software developers do want to push forward, Rymer offers these tips. Find out how well the vendor supports the “ilities”: security, scalability, availability, reliability and serviceability. Next, determine how each PaaS service jibes with the enterprise’s existing application development talent. Finally, nail down what benefits PaaS is likely to provide. “Cutting costs is a hard one to obtain. Time to market is relatively easy to obtain,” Rymer says.

### IaaS free-for-all

IaaS is currently the smallest market of the three major cloud categories, but is expected to have the fastest growth rate over the next three to five years. Gartner says last year’s total of just over \$2 billion will grow by that much for each of the next four years.

The 800-pound gorilla is Amazon. Competitors see EC2 both as an ingenious use of surplus compute power and a nemesis to be defeated by the marketing mantra that says a mass-market retailer simply cannot cater to the complicated needs of enterprise customers.

But this market is evolving to be more complicated than simply Amazon versus the rest of the IaaS world, says Lydia Leong, research

vice president at Gartner.

“If your differentiation is, ‘we’re not like Amazon, we’re enterprise-class!’, you’re now competing against dozens of other providers who also thought that would be a clever market differentiation. Not to mention that Amazon already serves the enterprise, and wants to deepen its inroads,” Leong wrote in a recent blog post.

Leong is Gartner’s go-to author when it comes to analyzing the IaaS market. Her report in December 2010 on the cloud IaaS and Web hosting provider market identified AT&T, Rackspace, Savvis (purchased by CenturyLink), Terremark (purchased by Verizon) and Verizon as the market leaders. Visionaries were Amazon, CSC, GoGrid, IBM and Joyent.

A new report analyzes a subcategory of IaaS vendors that offer automated, multi-tenant services for scale-out cloud hosting, virtual lab environments, self-managed virtual data centers and turnkey virtual data center services. Rackspace, AT&T, Savvis, Terremark, Verizon (with its home-grown Computing as a Service) and OpSource are the big names in this market.

“The separation [of these segments] is grounded in the fact that some vendors provide very good infrastructures without any services and others get the managed services right, but don’t have very good clouds,” Leong says.

The traditional, old-school telecom carriers are sometimes seen as dinosaurs, but Capgemini’s Coyle says they shouldn’t be discounted. “Just think of who controls all the bandwidth, right? It becomes a no-brainer then,” Coyle says.

The carriers have another advantage over cloud newbies: long-term relationships with enterprise customers. “When it comes to the cloud sale into big enterprises, we already have a seat at the planning table as a trusted service provider,” says Steve Caniano, vice president of AT&T’s hosting and cloud services.

AT&T, British Telecom and Verizon lead the pack of carriers in the cloud to some degree, but in terms of building out reliable IaaS-focused data centers, Verizon is the most advanced, Coyle says. He argues that the point of the Terremark purchase was not the extra data center footprint, but the management services that Terremark wraps around its IaaS.

Managed services are where the real money lies for cloud vendors, says Coyle, adding that the Amazons of the world are driving prices

down so low that the carriers will not be able to compete on raw compute power alone.

“IaaS companies are starting to realize they have to offer these managed services — or at least create APIs so you can have management software plug in and monitor these clouds like you do your internal assets — to get into the enterprise and pull in their next level of business,” Coyle says.

Rackspace was so confident that customers would be willing to pay for these wrap-around services like application deployment, deep system monitoring and unified hybrid cloud management, that the company spearheaded the OpenStack project to make basic IaaS platforms interoperable.

As vendors try to hone their competitive edges, customers are finding that they’re not limited to one IaaS provider.

Shelton Shugar, senior vice president for SaaS at CA Technologies, oversees IaaS vendor selection.

“You have to factor in each IaaS’s scale, global footprint, quality, price and the flexibility in which they can adapt to your particular project.” The answers to those questions will vary with the scope of each cloud project.

Having multiple (he advises not more than three or management becomes a nightmare) IaaS providers will become common place, says Shugar, who divulged his company uses Rackspace but declined to name the others in CA Technologies’ multi-vendor IaaS strategy. Having multiple IaaS providers gives CA better worldwide coverage and a bit of an edge in negotiating favorable terms.

“It’s good to have a couple of IaaS providers working for you to share the load,” says Doug Harr, CIO for Splunk, an ERP software developer in San Francisco which runs all of its computer operations in the cloud.

Harr explains that Amazon is the company’s default IaaS provider because its service is so wide and deep. “But every project brings a new evaluation, so the choice is wide open based on the use case,” Harr says.

And that seems to be the prevailing wisdom. Enterprises looking for cloud services should check out the big names, but should also take a good hard look at the many innovative cloud startups. ■

*Burns is a freelance writer and editor based in Carlisle, Pa., who has more than 15 years experience covering the networking industry. She can be reached at cburns1227@googlemail.com.*

**“It’s good to have a couple of IaaS providers working for you to share the load.”**

**DOUG HARR, CIO AT SPLUNK**



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TRADITIONAL  
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# CLOUD BUILDING ROLE

With scores of new cloud companies popping up and so many existing players jumping on the cloud bandwagon, we wondered where the traditional enterprise networking vendors stood.

Were they guilty of “cloudwashing” — slapping the cloud label on existing products? Were they ignoring the cloud and risking getting left in the dust? Were they scrambling to reinvent themselves as cloud service providers?

Turns out that companies like Cisco and Juniper, CA and Citrix are sticking to their core strengths and positioning themselves as enablers of the cloud, providing the underlying hardware and software just like they’ve been doing for enterprise and service provider customers for decades.

## CISCO

### UCS is key cloud building block

WebEx is successful SaaS player, but Cisco’s strategic focus is enabling cloud infrastructures

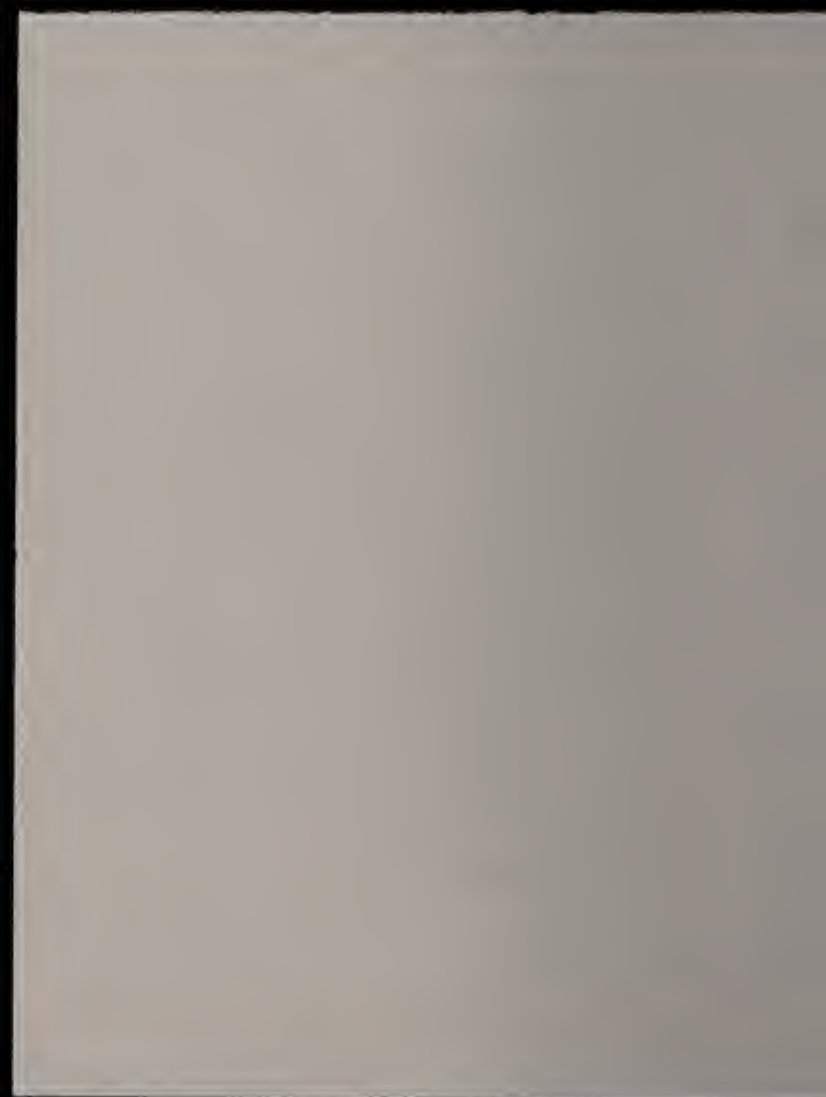
The only place Cisco plays directly in the cloud is in the SaaS arena with its WebEx collaboration, video and telepresence services, which account for about \$1 billion of Cisco’s \$40 billion in annual revenue.

“But where we’re really focused on is enabling people to build public clouds,” says Lew Tucker, Cisco’s CTO of cloud computing, using Cisco’s networking know-how, its reputation in both the enterprise and carrier markets, and, of course, its gear.











## CA TECHNOLOGIES

**Cloud 360**

Management heavyweight plays the role of enabler of cloud management services



**CA** Technologies addresses the public cloud in three ways: helping enterprises understand how to use it, enabling service providers to build it, and managing customers' expectations about how operating in the cloud will change how they do business.

Using the public cloud — whether you are talking about IaaS, PaaS or SaaS — requires discipline, says Andi Mann, CA Technologies vice president of enterprise and cloud solutions. “You can’t just throw mission critical applications with personally identifiable information up there because you are going to run into compliance, security, privacy, licensing and performance issues.”

To help customers determine the right applications and the right timing, CA wraps consulting services around several of its portfolio, project and capacity planning, and design and modeling tools in a program called Cloud 360.

The two main products are AppLogic, which enables IT departments and service providers to rapidly build and deploy cloud applications, and Automation Suite for Cloud, a cloud management suite that offers application deployment and workload management and provides a single interface for controlling both private-cloud and public-cloud resources.

“This gives service providers the turnkey underpinning they need to build out a public cloud service that can compete with the Amazons and the Rackspace, but with the security, auditing and reliability in place to attract the more conservative enterprise customers,” Mann says.

On a more general level, Mann argues that all of CA's infrastructure, application and security management tools can be used to allow an enterprise to closely monitor its activity in the cloud and the data collected can be used to help it transform how it does business there.

“If a business unit is now responsible for allocating its own IT consumption, they had better have a good handle on what they are paying for,” Mann says.

**“Using the public cloud — whether you are talking about IaaS, PaaS or SaaS — requires discipline.”**

**ANDI MANN, VICE PRESIDENT OF ENTERPRISE AND CLOUD SOLUTIONS, CA**

“But we also know that it’s not easy to stand up a cloud,” says Tucker, who was hired 14 months ago to develop Cisco's cloud strategy. Before coming to Cisco, Tucker was first vice president at Salesforce.com where he oversaw the development of AppExchange. And then he served as CTO at Sun where he was responsible for building Sun Cloud, an early IaaS platform targeting Java developers.

“While there are many different clouds out there, there is an underlying cloud model that we all adhere to. We want the cloud infrastructure to have a pool of server, networking and storage resources that we virtualize and turn into a service for applications to take advantage of,” Tucker says.

At the center of Cisco's cloud enablement strategy is its Unified Computing System (UCS), which is an enterprise-class blade-based platform that tightly integrates server and networking functions. Cisco introduced

UCS in 2009. Tucker qualifies UCS sales as “very successful” and industry reports say that as of August there were 7,400 UCS customers, 2,000 of which were added in the previous quarter.

Cisco is attacking cloud from another angle with its strategic partnership with EMC, VMware and Intel in a joint venture called the Virtual Computing Environment (VCE) Company. This is a way to give cloud providers an integrated infrastructure platform that will greatly speed up their time to market. VCE is headquartered in Dallas and sells its products as pre-integrated sets of Cisco switching and UCS servers, EMC storage,

and virtualization provided by VMware.

Cisco is also throwing its weight behind OpenStack, the open source cloud computing effort originally spurred by Rackspace. Tucker says Cisco is working with 14 other vendors to define a virtualized networking service called Quantum to help developers write applications that can inherently take advantage of more interesting network topologies and embedded network services.

“Essentially, we want developers to be able to spin up isolated virtualized L2 networks just as if they were spinning up virtual machines,” Tucker says.

**“But where we’re really focused on is enabling people to build public clouds.”**

**LEW TUCKER, CTO OF CLOUD COMPUTING, CISCO**





## CITRIX

## Virtualization and orchestration layers

CloudStack helps companies deploy and manage virtual machines

**IF** Citrix's XenServer virtualization platform is the body of what the company has to offer to service providers and enterprises looking to build and tap into the public cloud, then CloudStack is the brains.

CloudStack is the Java-based open source cloud orchestration software Citrix picked up with its recent acquisition of Cloud.com. It is designed to ease the administrative hassles associated with deploying and managing large networks of virtual machines.

About 80% of Cloud.com's customers were already using XenServer, "so those two layers have been working together for a very long time," says Sameer Dholakia, group vice president and general manager for the cloud platforms group at Citrix. That said, CloudStack can also manage Linux KVM, VMware's vSphere and Oracle's Oracle VM, as well as handle bare-metal provisioning. Support for Microsoft's Hyper-V is slated next year.

"It is core to our strategy not to create [vendor] lock-in at any layer in the stack," adds Dholakia.

More than 70% of Citrix's cloud-building business is done with telcos that see Amazon as a threat to their traditional revenue stream.

"Many of the service providers we are working with are building multiple cloud offerings built on different virtual infrastructures for a variety of timing and cost reasons and they are using CloudStack to manage them all," Dholakia says.

There are cost reasons for having multiple virtualization platforms as a cloud provider, but there "really is no reason why you'd want to maintain two, separate orchestration layers to manage them," Dholakia says.

One layer up in Citrix's cloud enablement

stack is CloudPortal, which is a suite of tools that enables a service provider to set up the business processes involved in running a public cloud. It provides things like onboarding, account management, billing and self-service provisioning.

For enterprises who want on-premise "public-like" cloud services behind their own firewall, Citrix's strategy hinges on the possibility of hybrid management. Through a combination of XenServer and CloudStack, customers could set up "cloud zones" within the same management interface. These cloud zones would have to be connected via another Citrix product called Cloud Bridge, which runs on top of the company's line of NetScaler VPN appliances.

"This is still a very early use case of our products. Most customers are really thinking about one side of the wire or the other," Dholakia says. But he contends the wind is definitely blowing public clouds into the enterprise landscape.

**“It is core to our strategy not to create [vendor] lock-in at any layer in the stack.”**

**SAMEER DHOLAKIA**, GROUP VICE PRESIDENT AND GENERAL MANAGER FOR THE CLOUD PLATFORMS GROUP AT CITRIX



## JUNIPER

## High-performance cloud fabric

Also, company has security tools and management software

**J**uniper has a three-pronged cloud strategy that includes selling networking gear into the data centers of most major IaaS players, providing secure connections between virtual data centers and cloud customers, and orchestrating how virtualized resources get allocated to cloud application services.

The cornerstone of Juniper's cloud effort is QFabric, says Mike Marcellin, vice president of strategy and marketing for Juniper's Platform Systems Group. QFabric is a new switching architecture announced in March that creates a single logical switch connecting the entire data center. It replaces Spanning

Tree, which links access, aggregation and core switches. By flattening the three-tier network, QFabric reduces latency in the data center.

QFabric is also a product line comprising the QF Director management platform; the QF Interconnect chassis, which is the logical switch fabric; and the QFX3500 node, a 10G top-of-rack switch that supplies high-density ingress and egress ports.

"Juniper has made its mark in leading in scale and performance. We've massively rethought how high data center networking happens and QFabric is how we are addressing performance there," Marcellin says.

On the security front, Juniper has a strong presence in the data center with its line of high-end SRX line of firewalls. Also, the company — by way of the acquisition of Altor Networks late in 2010 — now has a line of virtual network firewalls, the Virtual Gateway (vGW) series.

"For our customers who are trying to build out a cloud infrastructure, having a firewall sitting inside the hypervisor helps our

customers round out their security story," Marcellin says.

One of the biggest issues facing IaaS vendors, contends Marcellin, is how to efficiently orchestrate the delivery of infrastructure services to the apps running in the cloud.

For all the elements that Juniper provides, the company has tried to make them manageable via Junos Space, an open software platform that allows customers, partners, and developers to build and deploy apps that manage and analyze Juniper-provided network infrastructure.

"Think about an application that will let you configure many, many switches in an automated way. Or an application that lets you configure hundreds of virtual firewalls in an automated way," Marcellin says.

These tasks may sound pretty basic, Marcellin says, "but having a platform that enables this level of automated management will help Juniper customers avoid configuration errors in massive data centers supporting a public cloud." ■



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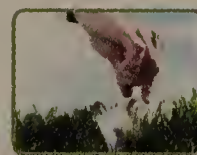
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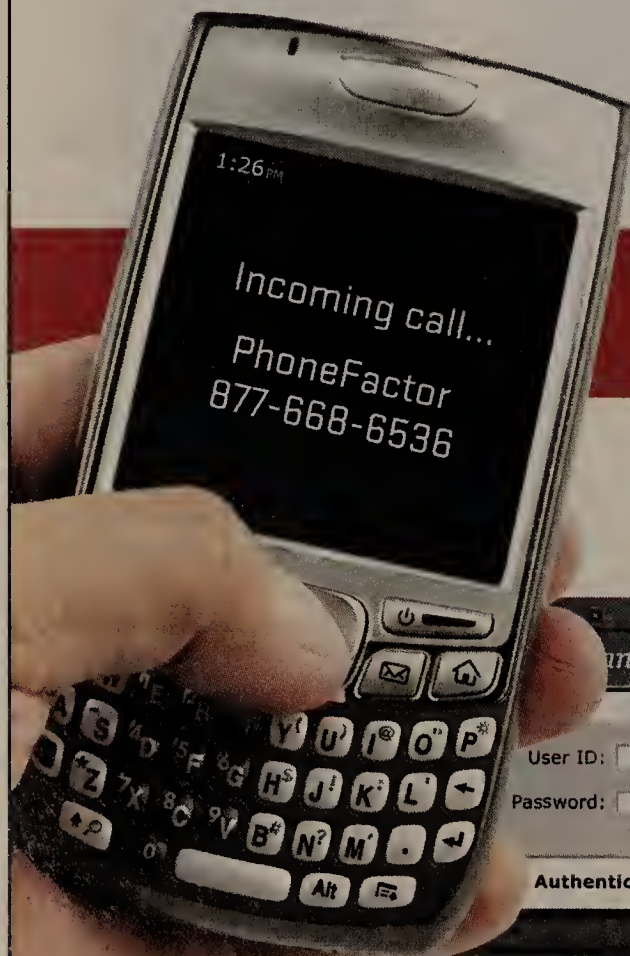
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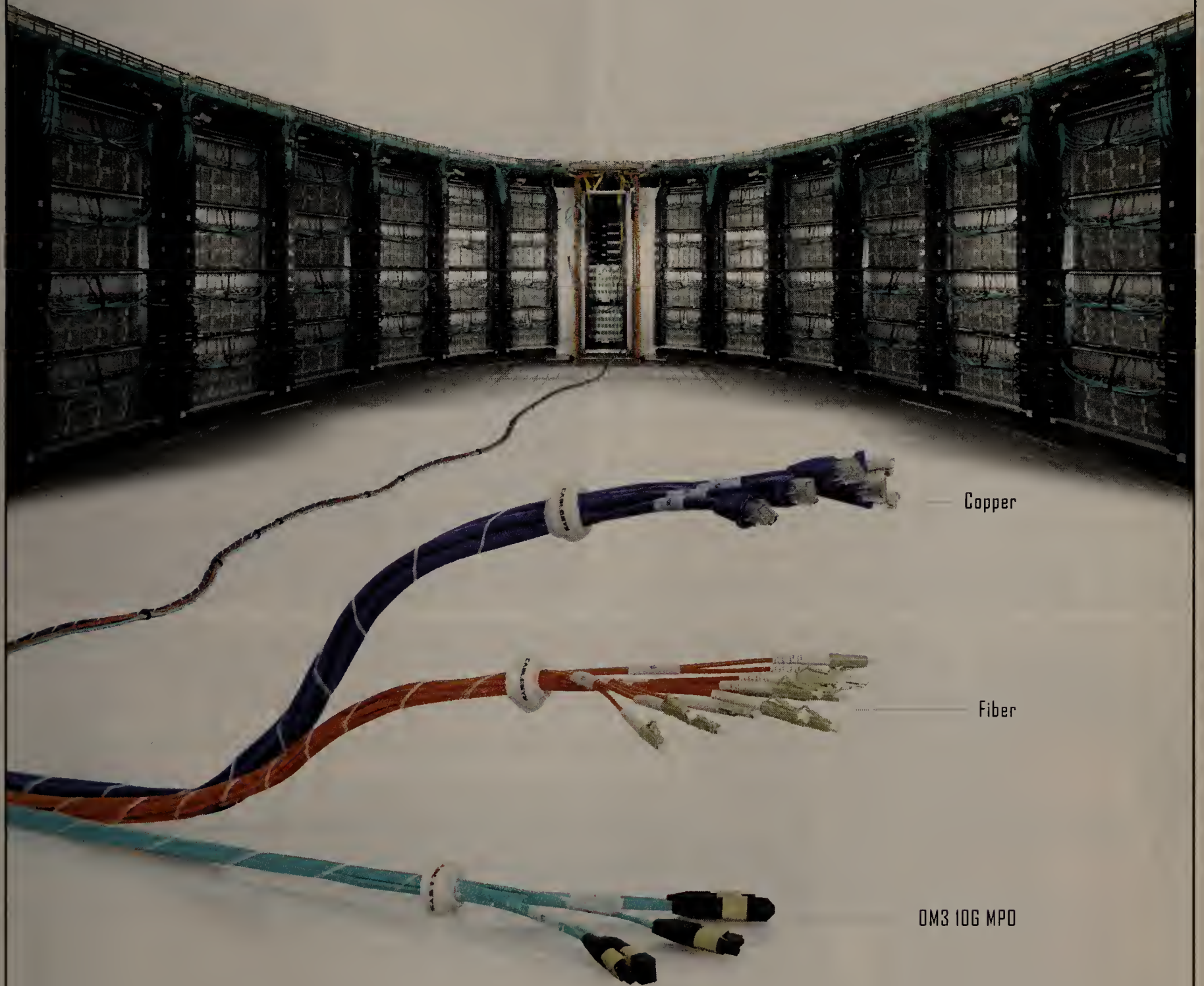


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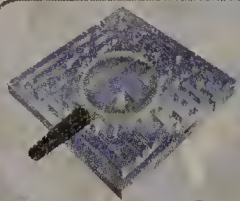
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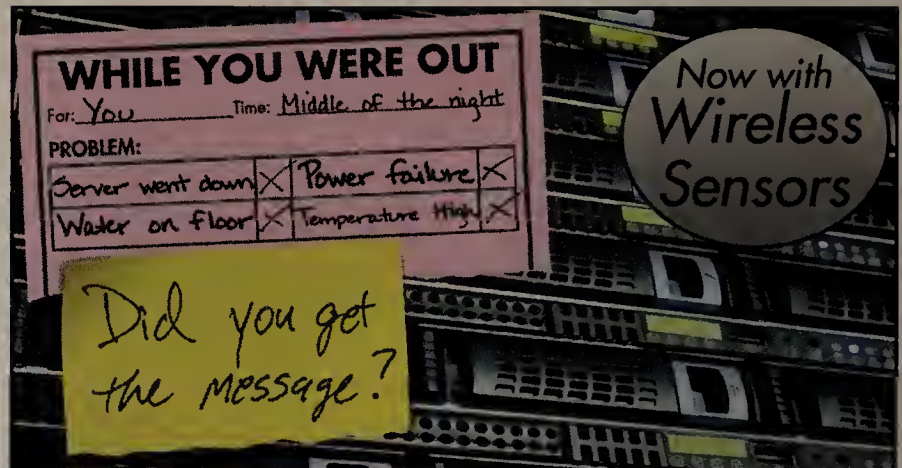
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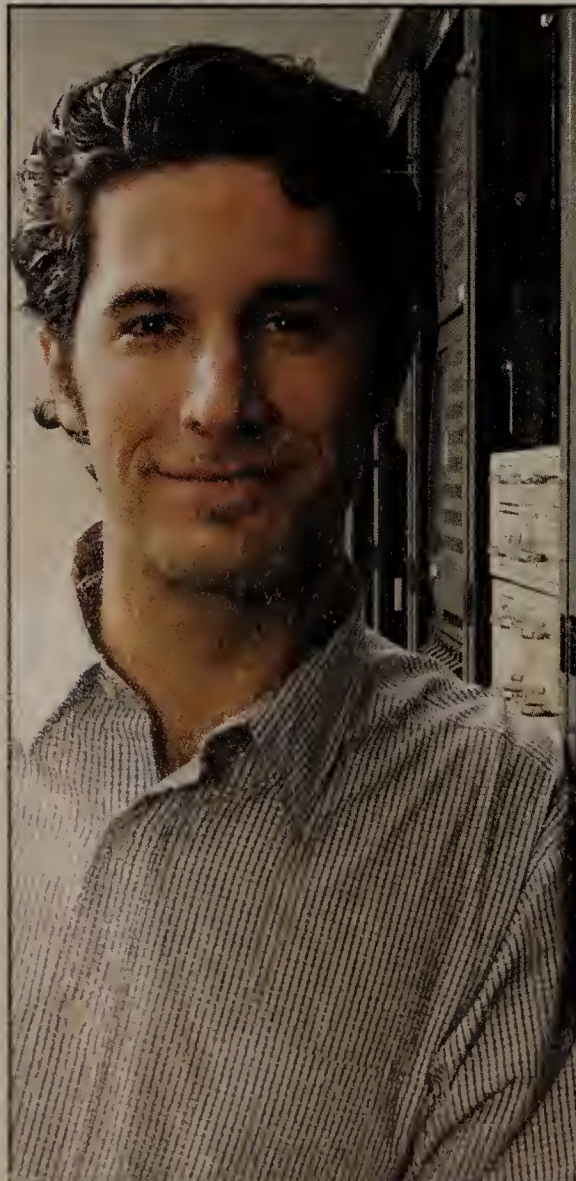


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## How stupid can cell carriers be? Really stupid

surprising. It's surprising because it makes you wonder, "How stupid can the carriers be?" It's not surprising because we already know the answer to that.

Here's what the furor is all about: Back in March an Android software developer using the alias "kOnane" noticed something odd: His Sprint-supplied Samsung smartphone included some fairly well-hidden software which was always started when the device was booted and was always running. Moreover, it was hard to stop the code.

A bit more sleuthing revealed that the software is called Carrier IQ (supplied by a company of the same name) and is intended to provide wireless service providers with data about the performance of smartphones for planning and diagnostic purposes. Unfortunately, the depth of Carrier IQ's data collection isn't restricted to stuff that cell carriers could reasonably want to know. Oh no. The software can collect much more and relay it back to the Carrier IQ mothership.

In other words, this software is an out-and-out rootkit, a hidden piece of code designed to be hidden and capable of monitoring everything that happens on a smartphone, including tracking which applications are run and for how long, as well as logging texts and email sent, numbers dialed, XML data read, Web pages loaded... you name it, Carrier IQ can detect and log it.

Over the following months people started to examine Carrier IQ in greater depth and discovered that its implementation was designed to be stealthy and that each vendor had customized the implementation

on its own devices. As for what data was collected, that was driven by the carrier sending commands remotely to the devices!

If you are running enterprise IT and care about security and privacy, the revelation that all of your smartphones are effectively loaded with an all-powerful, vendor-sanctioned rootkits has got to be pretty sobering. Not only has your carrier intentionally included a backdoor without telling you, but it's also created the potential for an entry point for hackers and malware that could capitalize on the logging services.

While collecting performance data makes sense for carriers, it's the scope of the data that can be acquired that has everyone so spun, and — and this is the biggie — the fact that you have not given your consent for this data to be collected!

What is the legal risk to all of the carriers that have deployed this software? They are guilty of the federal crime of unauthorized wiretapping and violation of privacy!

The enormity of this whole mess is just starting to come clear as the list of devices Carrier IQ can be found embedded on includes products from Samsung, HTC, Nokia and RIM. According to the Carrier IQ website, something north of 141 million smartphones are running their software! Can you say "class action"?

When there's such minimal real competition in the service provider market and such minimal external oversight on what the carriers can do, this is what happens. Anyone who thinks that the carriers don't need regulation and that the "free market" organically solves these kinds of problems is living in a dream world. ■

*Gibbs has his data collected in Ventura, Calif., (backspin@gibbs.com).*



## Don't expect Woz to bid on this Apple contract

late Steve Jobs, Steve Wozniak and Ron Wayne — no doubt caught the eye of techie collectors and even sparked speculation that Apple might buy the document.

Sotheby's expects the Dec. 13 auction to fetch up to \$150,000.

We'll see about that, but don't expect Wozniak to be among bidders, because, well, he believes this contract is kind of overrated.

He doesn't doubt its authenticity, mind you. He does, however, question the historical significance that has been attached to its signing, as I learned through an email exchange with him back in the spring.

In a nutshell, I had caught wind of the fact that Woz has long doubted the almost universally accepted story that Apple was founded on April Fools' Day in 1976. Unable to find documentation of that fact online myself, I turned to Owen Linzmayer, author of "Apple Confidential 2.0" by No Starch Press, who quickly found a copy in his files of the very contract that is about to go on the auction block.

It is indeed dated April 1, 1976, and is indeed signed by Jobs, Wozniak and Wayne.

When I sent Woz a copy of my copy, I figured that would be the end of the discussion. It was not. He replied:

"This was the partnership formed to produce a PC board for the 'Apple I.' It was actually a different company than the one that got financed and produced the Apple II. This one was a partnership. The real company was a corporation. So it's a bit murky."

Linzmayer begged to differ, having this to say about Woz's reading:

"Seems like splitting hairs to claim that the Jobs/Woz/Wayne partnership that produced the Apple I isn't the same company that Jobs/Woz and [early investor/CEO Mike] Markkula incorporated shortly thereafter. Two of the founders are the same, the industry is the same, the companies share the same name, and the products are the Apple I and Apple II. Technically Woz is correct in that Apple Computer the partnership isn't the same legal entity as Apple Computer Inc., but to call it murky is stretching it."

Personally, I still find Linzmayer's assessment more compelling than Wozniak's, even though that requires discounting the fact that Woz was there and Linzmayer wasn't.

Nevertheless, if I was ponying up \$150,000 for "The Contract That Founded Apple," I'd at least want to know that one of Apple's founders harbors such doubts about its historical stature.

### They're never too young to learn about passwords

That the little girl had a netbook was slightly surprising, given that she couldn't have been older than 7 or 8. But her conversation with her Mom about the machine — overheard at my son's basketball practice last week — wasn't surprising at all, unfortunately.

"Mommy, my password isn't working." (Hands netbook to Mom.)

"What's your password again, sweetie?"

"Password."

How I managed to resist the face-palm remains a mystery. ■

*Please send your long-lost Apple documents and password tales to buzz@nww.com.*





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